

Introduction to Anatomy and Physiology

ORGANIZATION

- Anatomical = structure
- Physiological = function

ANATOMICAL

- Surface anatomy
- Systemic anatomy
- Regional anatomy
- Disciplinary anatomy
 - Gross, Microscopic, etc.
- Radiographic anatomy
- Cellular anatomy (Cytology)

PHYSIOLOGICAL

- Cell physiology
- Exercise physiology
- Systems
 - Renal, Endocrine, etc.

ORGANIZATIONAL LEVELS

- Chemical: atoms and molecules
- Cellular: structural/functional units
- Tissue: particular function
 - Epithelial, CT, Muscle, Nerve
- Organs: > two tissue with purpose
- System: related organs

PRINCIPAL SYSTEMS

1. Integumentary
2. Nervous & Sensory
3. Skeletal
4. Muscular & Vascular
 - a. Head, Neck & Trunk
 - b. Upper Extremities
 - c. Lower Extremities

PRINCIPAL SYSTEMS

- 5. Endocrine –
- 6. Cardiovascular
- 7. Lymphatic and immune
- 8. Respiratory
- 9. Digestive
- 10. Urinary
- 11. Reproductive
- (10./11. Urogenital)

PHYSIOLOGICAL PROCESSES

- Metabolism
- Responsiveness
- Movement
- Growth
- Differentiation
- Reproduction

INTRODUCTION

- Three noninvasive techniques of palpation, auscultation, and percussion are used to assess certain aspects of body structure and function:
 - In **palpation** the examiner feels body surfaces with the hands; an example would be pulse and heart rate determination.

INTRODUCTION

- In **auscultation**, the examiner listens to body sounds to evaluate the functioning of certain organs, as in listening to the lungs or heart.
- In **percussion**, the examiner taps on the body surface with the fingertips and listens to the resulting echo.

LEVELS OF ORGANIZATION

- The human body consists of several levels of structural organization:
 - 1. The **chemical** level includes atoms, the smallest units of matter that participate in chemical reactions, and molecules, two or more atoms joined together.
 - 2. **Cells** are the basic structural and functional units of an organism.

LEVELS OF ORGANIZATION

- The human body consists of several levels of **structural organization**:
 - 1. The **chemical** level includes atoms, the smallest units of matter that participate in chemical reactions, and molecules, two or more atoms joined together.

LEVELS OF ORGANIZATION

- 3. ***Tissues*** consist of groups of similarly specialized cells and the substances surrounding them that usually arise from a common ancestor and perform certain special functions.

LEVELS OF ORGANIZATION

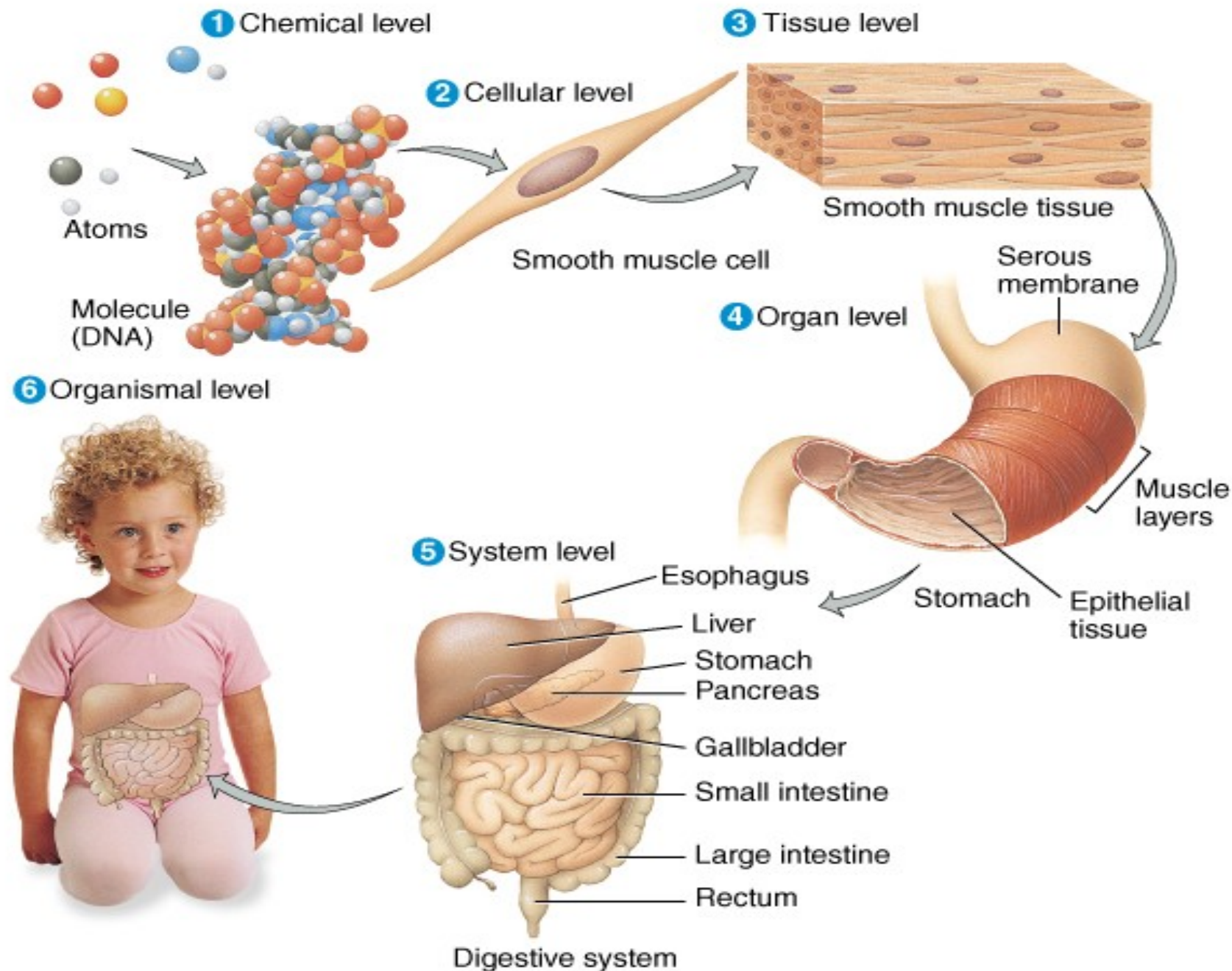
- 4. ***Organs*** are structures of definite form that are composed of two or more different tissues and have specific functions.

LEVELS OF ORGANIZATION

- 5. **Systems** consist of related organs that have a common function. The **systems** of the human body are the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic, respiratory, urinary, and reproductive (Table 1.2).

LEVELS OF ORGANIZATION

- 6. The human ***organism*** is a collection of structurally and functionally integrated systems; any living individual.



CHARACTERISTICS OF LIFE

- Basic Life Processes
 - All living things have certain characteristics that distinguish them from nonliving things.

CHARACTERISTICS OF LIFE

- Among the life processes in humans are:
 - **metabolism**, responsiveness, **movement**, growth, differentiation, and reproduction.

CHARACTERISTICS OF LIFE

- ***Metabolism*** is the sum of all chemical processes that occur in the body, including catabolism and anabolism.

CHARACTERISTICS OF LIFE

- ***Responsiveness*** is the ability to detect and respond to changes in the external or internal environment.
- ***Growth*** refers to an increase in size and complexity, due to an increase in the number of cells, size of cells, or both.

CHARACTERISTICS OF LIFE

- ***Movement*** includes motion of the whole body, individual organs, single cells, or even organelles inside cells.
- ***Differentiation*** is the change in a cell from an unspecialized state to a specialized state.

CHARACTERISTICS OF LIFE

- ***Reproduction*** refers either to the formation of new cells for growth, repair, or replacement, or the production of a new individual.
- ***Homeostasis*** is a condition of equilibrium in the body's internal environment produced by the ceaseless interplay of all the body's regulatory processes.

BODY FLUIDS

- For the body's cells to survive, the composition of the surrounding fluids must be maintained precisely at all times.
- Fluid inside body cells is called ***intracellular fluid.***

BODY FLUIDS

- Fluid outside body cells is called ***extracellular fluid*** (ECF) and is found in two principal places.
 - ECF filling the narrow spaces between cells of tissues is called interstitial fluid, intercellular fluid, or tissue fluid.

BODY FLUIDS

- ECF in blood vessels is termed plasma.
- Since ECF is in constant motion throughout the body and also surrounds all body cells, it is often called the body's internal environment.

HOMEOSTASIS

- Process whereby a relative state of “constancy” is maintained by, or within, the body’s internal environment

CONTROL OF HOMEOSTASIS

- **Homeostatic** imbalances occur because of disruptions from the external or internal environments.
 - Homeostasis is regulated by the nervous system and endocrine system, acting together or independently.

CONTROL OF HOMEOSTASIS

- The **nervous system** detects changes and sends nerve impulses to counteract the disruption.
- The **endocrine system** regulates homeostasis by secreting hormones.
- Whereas nerve impulses cause rapid changes, hormones usually work more slowly.

CONTROL OF HOMEOSTASIS

- **Feedback Systems**

- A *feedback system* is a cycle of events in which information about the status of a condition is continually monitored and fed back (reported) to a central control region (Fig. 1.2).
- Any disruption that changes a controlled condition is called a **stimulus**.